Amendments to the Drawings:

Please replace original Figures 2 and 4 with the attached replacements sheets for Figures 2 and 4, respectively. Additionally, new sheets have been included for newly added Figures 5 and 6.

Attachments:	Replacement Sheets	2 page(s)
	New Sheets	2 page(s)

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REMARKS

The drawings are objected to because the reference numbers in Figure 2 do not match with the description in the specification (see paragraph [15], e.g., an incoming positive in-phase terminal I coupled to a first end of the first resistor R1 and a first end of the first capacitor C11 using a first connection Con1

Applicant has provided a replacement sheet for Figure 2 having all the connections (Con1 to Con8) being relabeled in positions that match the specification as described in paragraph 15 and the claims. No new matter is entered.

Applicant has additionally provided a replacement sheet for Figure 4 having the labeling of Con3 and Con4 being reversed and the positions of I and Q on the right hand side of the figure also being reversed. In this way, Figure 4 now also matches the labeling conventions of Figure 2 and Figure 3 in addition to the claims. No new matter is entered.

The drawings are objected to under 37 CFR 1.83a because they must show every feature specified in the claims. Therefore, claims 5, 6, 8, and 9 must be shown or the features canceled from the claims.

Applicant has provided new drawing sheets for Figure 5 and Figure 6.

Figure 5 shows the polyphase network is implemented on a substrate having a plurality of layers, and the connections use vias to traverse the layers. Figure 5 is an illustration of the description in paragraph [17] of the specification and claims 5, 8 as originally filed. No new matter is entered.

Figure 6 shows the first and second connections have substantially equivalent lengths and number of vias, the third and sixth connections have substantially equivalent lengths and number of vias, the fourth and fifth connections have substantially equivalent lengths and number of vias, and the seventh and eighth connections have substantially

equivalent lengths and number of vias. Figure 6 is an illustration of the description in paragraph [17] of the specification and claims 6, 9 as originally filed. No new matter is entered.

The specification is also amended in order to introduce the new Figures 5 and 6. Specifically, new paragraphs [14.1] and [14.2] are entered in the brief description of drawings section, and paragraph [17] is amended to refer to newly added Figures 5 and 6. No new matter is entered.

Claim 13 is rejected under 35 USC 102b as being anticipated by Egami et al. (US '831)

Applicant asserts that the present invention as claimed in claim 13 is not anticipated by Egami et al. because Egami et al. do not teach all the elements included in claim 13.

Examiner stated that in Fig.9 Egami et al. discloses a polyphase network 12 comprising: first, second, third and fourth impedances of the first type (the first four sets of 90deg HYB in the multiport hybrid coupler 12); and first, second, third and fourth impedances of a second type (the middle four sets of 90deb HYB in the multi-port hybrid coupler 12). However, applicant points out that 90deg HYB circuit block of Egami et al. is actually different than an impedance. As described in col 5, lines 11-42 referring to Figs.4A, 4B, 5A, 5B, 6A, and 6B, Egami et al. describe the operation of a single HYB coupler. In particular, applicant points out that the HYB coupler of Fig.6A and Fig.6B has two input terminals and two output terminals and is taught by Egami et al. to perform a function where 'an input signal from the input terminal "a" is divided into two equal signals phased +90deg (or -90deg) apart from each other, which are provided to the output terminals "a" and "b", respectively. An input signal from the input terminal "b" is divided into two equal signals displaced –90deg (or +90deg) apart from each other in phase, which are applied to the output terminals "a" and "b", respectively.' Applicant points out that said functionality is different than that of an impedance. Furthermore,

Egami et al. do not teach that the 90deg HYB circuit blocks of Fig.9 are implemented as impedances, and Egami et al. do not teach having a first type of impedance and a second type of impedance.

For at least the above reason, applicant asserts the present invention as claimed in claim 13 is not anticipated by Egami et al. because Egami et al. do not teach providing first and second types of impedances as stated in claim 13. Reconsideration of claim 13 is respectfully requested.

Claims 1-10 are rejected under 35 USC 103a as being unpatentable over Egami et al. (US '831)

Applicant asserts that the present invention as claimed in claims 1-10 should not be found unpatentable over Egami et al. because Egami et al. do not teach all the features as claimed and it would not be obvious for a person skilled in the art to deduce the missing features without further inventive process.

Concerning independent claim 1, in addition to the above provided remarks that the 90deg HYB circuit blocks are not equal to impedances, applicant further points out that Egami et al. do not teach or suggest the following limitations present in claim 1 regarding the layout of the polyphase network:

wherein the first and fourth impedances of the first type are substantially equal distances from and on a same side of a first axis, and are substantially equal distances from and on opposite sides of a symmetry axis;

the second and third impedances of the first type are substantially equal distances from and on a same side of the first axis, and are substantially equal distances from and on opposite sides of the symmetry axis;

the first and fourth impedances of the second type are substantially equal distances from and on a same side of a second axis, and are substantially equal distances

from and on opposite sides of the symmetry axis; and

the second and third impedances of the second type are substantially equal distances from and on a same side of the second axis, and are substantially equal distances from and on opposite sides of the symmetry axis.

The fact that the polyphase network has a physical layout positioned symmetrically is a feature of the present invention. For example, refer to paragraph [7] stating, "one objective of the claimed invention is therefore to provide a symmetrical polyphase network having a symmetrical layout". Additionally, the exemplary embodiments shown in Figures 2-4 and the corresponding portions of the description describe the first axis A_1, the second axis A_2, and the symmetry axix A_S. These features as included in claim 1 should therefore be given weight when considering patentability. Egami et al. do not teach these layout features or provide any motivation of why these limitations should be present. Examiner stated that the network 12 of Egami et al. is a symmetrical circuit, however, as explained in paragraph [6] of the present invention, having a symmetrical circuit structure from an electrical perspective is not equal to having a symmetrical physical layout structure. It is not obvious or even desirable that all circuits should have a physically symmetrical layout structure, therefore, applicant asserts that even if a person skilled in the art provided positive and negative in-phase/quadrature-phase terminals in the device of Egami et al. as was stated by Examiner, the result would not be the same as the present invention because the symmetrical layout requirements are not taught by Egami et al.

For at least the above reasons, applicant asserts that the present invention as claimed in independent claim 1 should be found allowable over Egami et al. Reconsideration of independent claim 1 is respectfully requested. As claims 2-10 are dependent on claim 1, if claim 1 is found allowable, so too should dependent claims 2-10. Further comments regarding the patentability of dependent claims 2-10 is given below.

Concerning dependent claims 2 and 3, Examiner stated these claims are inherent

from the device of Egami et al. since the network 12 is a symmetrical circuit. Applicant again points out that being symmetrical from an electrical viewpoint (i.e., a schematic diagram as shown in Fig.9 of Egami et al.) is not equivalent to being symmetrical from a physical layout viewpoint (i.e., a layout diagram as shown in Figs 2-4 of the present invention). Egami et al. do not teach anything about the physical layout, and therefore do not teach that "the first axis is adjacent and substantially parallel with the second axis" (claim 2), or that "the symmetry axis is substantially perpendicular to the first axis and the second axis" (claim 3). Reconsideration of claims 2 and 3 is respectfully requested.

Concerning dependent claims 6 and 9, applicant points out that Egami et al. do not teach or suggest "the first and second connections have substantially equivalent lengths and number of vias, the third and sixth connections have substantially equivalent lengths and number of vias, the fourth and fifth connections have substantially equivalent lengths and number of vias, and the seventh and eighth connections have substantially equivalent lengths and number of vias", as is claimed in claims 6 and 9 of the present invention. Examiner stated that this is obvious design modification since such design technique is well known in the art, and requires only a routine skill in the art. Applicant points out that it is not well known or desirable to make all connections having the same length and number of vias as this would significantly complicate layout design. Because Egami et al. do not teach these requirements for the connections, or suggest that such a requirement would be beneficial, applicant asserts that said requirements would not be obvious to a person skilled in the art because there is no stated motivation or benefit of such specific layout requirements provided by Egami et al. Reconsideration of claims 6 and 9 is respectfully requested.

Claims 11, 12, 14, and 15 are rejected under 35 USC 103a as being unpatentable over Egami et al. (US '831) in view of Molnar et al. (US '543)

Applicant asserts that the present invention as claimed in claims 11, 12, 14, and 15

should not be found unpatentable over Egami et al. in view of Molnar et al. because combining said references does not result in the present invention as claimed.

Examiner stated that "the 90deg hybrid coupler in the device of Egami et al. is functionally equivalent to 90deg phase shifter of Molnar et al. Therefore, it would have been obvious to one of ordinary skill in the art to use the four-port 90deg phase shifter of Molnar et al. as the impedances of the first and second types in the device of Egami et al. since both phase shifters are functionally equivalent."

Applicant points out that claim 11 states, "the impedances of the first type are resistors and the impedances of the second type are capacitors, or the impedances of the first type are capacitors and the impedances of the second type are resistors." As shown in Fig.3 of Molnar et al, the 90deg phase shifter includes two resistors and two capacitors coupled together in a particular way. Therefore, using the 90deg phase shifter of Molnar et al. as the impedances of the first and second types would not result in the present invention as claimed in claim 11. Specifically, the 90deg phase shifter of Molnar et al. is not equivalent to a resistor, and is also not equivalent to a capacitor. A similar argument also applies for claim 14. Reconsideration of claims 11 and 14 is respectfully requested.

Concerning claim 12, applicant further points out that neither Egami et al. nor Molnar et al. teach having the resistors having the same resistance and the capacitors having the same capacitance. A similar argument also applies for claim 15. Reconsideration of claims 12 and 15 is respectfully requested.

New Claims

Applicant has added new claim 16 being dependent on claim 1 to specifically claim that the first axis, second axis, and symmetry axis refer to the physical layout of the polyphase network on a substrate. No new matter is added. In particular, refer to Figures 2-4 showing layout diagrams of different embodiments of the present invention. As indicated above, Egami et al. do not teach or suggest having a symmetrical physical

layout, therefore, applicant asserts that claim 16 should be found allowable over Egami et al. Consideration of new claim 16 is respectfully requested.

Applicant has also added new claim 17 being dependent on claim 1 and new claim 19 being dependent on claim 13 to specifically claim that "the first, second, third, and fourth impedances of the first type each have a first impedance value; the first, second, third, and fourth impedances of the second type each have a second impedance value; and the first impedance value is different than the second impedance value." No new matter is entered. In particular, refer to paragraph [15] stating, "In each layout, the symmetrical PPN 200, 300, 400 includes first, second, third, and fourth resistors (R1 - R4) having substantially the same resistance arranged sequentially along a first axis A_1; first, second, third, and fourth capacitors (C1 - C4) having substantially the same capacitance", and paragraph [20] stating, "in other embodiments, the resistors (R1 – R4) are replaced with impedances of a first type, and the capacitors (C1 -- C4) are replaced with impedances of a second type". Applicant points out that Egami et al. teach having the same 90deg HYB as the first four sets of 90deg HYB in the multiport hybrid coupler 12 and as the middle four sets of 90deg HYB in the multi-port hybrid coupler 12. Therefore, applicant asserts that new claims 17 and 19 should not be found anticipated or unpatentable in view of Egami et al. because Egami et al. do not teach having different impendence values. Consideration of new claims 17 and 19 is respectfully requested.

Applicant has also added new claim 18 being dependent on claim 1 and new claim 20 being dependent on claim 13 to specifically claim that "the first, second, third, and fourth impedances of the first type each have a first phase angle characteristic; the first, second, third, and fourth impedances of the second type each have a second phase angle characteristic; and the first phase angle characteristic is different than the second phase angle characteristic." No new matter is entered. In particular, refer to paragraph [20] stating, "As long as a first phase angle characteristic of the first impedance type is different than a second phase angle characteristic of the second impedance type, the resulting PPN according to the present invention will be symmetrical at both low and high

frequencies." Applicant points out that Egami et al. teach having the same 90deg HYB as the first four sets of 90deg HYB in the multiport hybrid coupler 12 and as the middle four sets of 90deg HYB in the multi-port hybrid coupler 12. Therefore, applicant asserts that new claims 18 and 20 should not be found anticipated or unpatentable in view of Egami et al because Egami et al. do not teach having different phase angle characteristics. Consideration of new claims 18 and 20 is respectfully requested.

Sincerely yours,

Winston Hsu Date: 02.23.2006

Winston Hsu, Patent Agent No. 41,526
P.O. BOX 506, Merrifield, VA 22116, U.S.A.
Voice Mail: 302-729-1562
Facsimile: 806-498-6673
e-mail : winstonhsu@naipo.com

Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 13 hours behind the Taiwan time, i.e. 9 AM in D.C. = 10 PM in Taiwan.)